REMARKS

Claims 1-20 have been elected for prosecution on the merits. Claims 1, 4, 5, and 6 are independent.

Claim Rejections – 35 U.S.C. 112

Claim 9 has been rejected under 35 U.S.C. 112, second paragraph, as being indefinite. Applicants determined that part of claim 9 had inadvertently been left off. Based on the disclosure on page 10, lines 4-10, of the Specification, Applicants have added the missing language in order to complete claim 9. Accordingly, Applicants respectfully request that the rejection be withdrawn.

Claim Rejection – 35 U.S.C. 102; Ogino

Claims 1 and 2 have been rejected under 35 U.S.C. 102(b) as being anticipated by Ogino et al. (U.S. Patent 5,907,571, hereinafter Ogino). Applicants respectfully traverse this rejection.

Summary of the Present Invention

A problem with laser light beams has been that they exceed a safety level of eyes, such that it has not been allowable to emit a semiconductor laser light beam directly into space. As such, an international standard IEC60825-1 has been established for regulating the range of emitted light by semiconductor laser chips (Specification, page 36, lines 6-16). The approach taken in the present invention is to use a resin having a light diffusion capability such that the laser light emitted from a semiconductor chip is safely released into space

after being diffused by the resin (Specification at page 22, lines 4-10; page 36, lines 18-23).

The resin is made to have diffusion capability by a mixture of a transparent epoxy resin and a silica resin which have different refractive indexes (Specification at page 36, line 23, to page 37, line 2). Furthermore, the resin is formed such that it does not contact the semiconductor laser chip. Thus, the semiconductor laser chip is not distorted in forming the resin. A container having a thermal resistance of preferably about 150 deg/W contains the semiconductor laser chip. (Specification at page 37, lines 4-16).

Claims

Claim 1 is directed to a semiconductor laser device including a semiconductor laser chip and a resin having a light diffusion capability. Claim 2 further recites wherein the semiconductor laser chip does not directly contact the resin. Applicants submit that Ogino fails to teach or suggest at least the claimed resin having a light diffusion capability.

The Office Action alleges that Ogino's translucent seal resin 6 constitutes the claimed resin having a light diffusion capability covering the semiconductor laser chip. The Office Action further states that the light diffusion capability is inherent in Ogino by virtue of the inherent property of epoxy resin and acrylic resin to scatter photons. Applicants disagree.

> Anticipation is established only when a single prior art reference discloses, expressly or under the principles of inherency, each and every element of a claimed invention as well as disclosing structure which is capable of performing the recited functional limitations. RCA Corp. v. Applied Digital Data Sys., Inc., 730 F.2d

1440, 1444, 221 USPQ 385, 388 (Fed. Cir.); cert. Dismissed, 468 U.S. 1228 (1984); W.L. Gore and Assoc., Inc. v. Garlock, Inc., 721 F.2d 1540, 1554, 220 USPQ 303, 313 (Fed. Cir. 1983), cert. Denied, 469 U.S. 851 (1984).

In Ogino, the laser beam of a conventional resin-seal type semiconductor laser device is emitted along a laser axis 1x in the form of an elliptic cone having an apex at the end face of the laser diode chip 1 (Ogino at column 1, lines 28-31; Figures 9 and 10). The laser beam is thus transmitted through the translucent end-face breaking preventive layer and translucent seal resin. Ogino is directed to improvements of avoiding peeling or separation between an end-face breaking preventive layer and the seal resin caused by thermal stress, and preventing cracking in the end-face preventive layer. Thus, Ogino's semiconductor device emits a laser beam in the form of an elliptic cone that is not diffused in the resin.

A reason that Ogino's semiconductor device does not diffuse the laser beam is that it is intended for use in optical apparatuses, such as compact disc, a laser beam printer, and the like (Ogino at column 2, lines 1-4). It is not anticipated for use in applications that might come into contact with the human eye.

Thus, Applicants submit that there is no evidence in Ogino that the seal resin 6 in Ogino inherently has a light diffusion capability. Accordingly, Applicants submit that Ogino fails to teach or suggest the claimed resin having a light diffusion capability, and thus fails to teach each and every claimed element of claim 1. As claim 2 depends from claim 1, Applicants further submit

that Ogino also fails to teach each and every claimed element of that claim as well.

Applicants respectfully request that the rejection be withdrawn.

Claim Rejection – 35 U.S.C. 102; Amano

Claims 1-3 have been rejected under 35 U.S.C. 102(b) as being anticipated by Amano et al. (U.S. Patent 5,355,385, hereinafter Amano). Applicants respectfully traverse this rejection.

Claim 1 is directed to a semiconductor laser device including a semiconductor laser chip and a resin having a light diffusion capability. Claim 2 further recites wherein the semiconductor laser chip does not directly contact the resin. Claim 3 further recites a light diffusion plate provided between the semiconductor laser chip and the resin. Applicants submit that Amano fails to teach or suggest at least the claimed resin having a light diffusion capability. Further with respect to claim 3, Applicants submit that Amano fails to teach or suggest at least the claimed light diffusion plate.

Again, as in the above rejection based on Ogino, the Office Action alleges that Amano's resin 9 inherently has a light diffusion capability (inherently by virtue of its constitution from photon-scattering material such as epoxy resin). Again, Applicants disagree. As can be seen in Amano's Figure 4, the laser beam 55 of the laser diode chip is emitted in such a manner that the beam area expands in the direction of emergence (Amano at column 4, lines 54-57). The laser diode chip is encapsulated with an encapsulating resin 9, such as transparent epoxy resin or the like (Amano at column 4, lines 23-25). Thus, the

expansion of the laser beam is based on the laser beam as emitted and the transparent encapsulating epoxy resin does not diffuse the laser beam.

Therefore, Applicants submit that there is no evidence in Amano that the encapsulating resin 9 in Amano inherently had a light diffusion capability. Accordingly, Applicants submit that Amano fails to teach or suggest at least the claimed resin having light diffusion capability, and thus fails to teach or suggest each and every claimed element of claim 1, as well as dependent claims 2 and 3.

Further with respect to claim 3, the Office Action alleges that the end-face-breakage preventing layer 10 constitutes the claimed light diffusion plate. Applicants disagree. The end-face-breakage preventing layer 10 is constituted by a heat-resistant silicon-based resin coated on a light-emitting end face (Amano at column 3, lines 60-68; column 4, lines 26-30). It has a low laser-beam absorbance. It serves to prevent the problem of where the encapsulating resin layer 9 in the vicinity of the light-emitting end face is decomposed by the heat generated at this face (Amano at column 1, lines 35-38; column 1, line 65, to column 2, line 2). Thus, Applicants submit that the end-face-breakage preventing layer 10 does not constitute a light diffusion plate. Accordingly, at least for this additional reason, Applicants submit that Amano does not teach or suggest each and every element of claim 3.

Applicants respectfully request that the rejection be withdrawn.

Claim Rejecti ns – 35 U.S.C. 103

Claims 4 and 7 have been rejected under 35 U.S.C. 103(a) as being unpatentable over either Ogino or Amano in view of Claisse et al. Claim 14 has been rejected under 35 U.S.C. 103(a) as being unpatentable over Ogino and Claisse, or Amano and Claisse, as applied to claim 4, and further in view of Hazell et al. Claims 5 and 8 have been rejected under 35 U.S.C. 103(a) as being unpatentable over Ogino in view of Hirayama et al., or Amano and Hirayama et al. Claims 6, 9, and 20 have been rejected under 35 U.S.C. 103(a) as being unpatentable over Ogino in view of Andrews (U.S. Patent 5,422,905), or over Amano in view of Andrews. Claims 10 and 11 have been rejected under 35 U.S.C. 103(a) as being unpatentable over Ogino in view of Okuda, or, Amano and Okuda (U.S. Patent 6,049,423). Claims 12 and 13 have been rejected under 35 U.S.C. 103(a) as being unpatentable over Ogino or Amano, in view of either Andrews and Brooks et al. (U.S. Patent 6,049,125), or in view of Missaggia et al. Claims 15 and 17 have been rejected under 35 U.S.C. 103(a) as being unpatentable over either Ogino and Andrews, or Amano and Andrews. Claims 16, 18 and 19 have been rejected under 35 U.S.C. 103(a) as being unpatentable over Ogino and Chaisse, or Amano and Chaisse, as applied to claim 4, and further in view of Kudo et al. At least for the reasons above for claim 1, Applicants submit that each and every element of the respective claims are not taught or suggested, and thus the rejections under 35 U.S.C. 103(a) fail to establish *prima facie* obviousness. Accordingly, Applicants respectfully request that the rejections be withdrawn.

Further with respect to claim 7, and also with respect to claim 8, the Office Action improperly alleges that the claimed features are inherent without providing evidence of inherency. For example, the Office Action states "the control that is the essence of claim 7 is inherent in the device of claim 4." No evidence is provided in the references relied on for supporting this allegation. In addition, as neither Ogino or Amano teach or suggest a resin having a light diffusion capability, Applicants submit that it would not be inherent in either reference that the size, material, and shape of the resin would have an effect on, for example, radiation angle of an emitted light beam. As an example, in each of Ogino and Amano, the shape of the resin is not a factor in the radiation angle of the emitted light beam. Thus, at least for this additional reason, Applicants submit that the rejection fails to establish *prima facie* obviousness for claims 7 and 8.

Further with respect to claim 10, Applicants submit that Okuda does not teach or suggest wherein materials having different refractive indexes are mixed into the resin, or more specifically with respect to claim 11, wherein the materials include transparent epoxy resin and a silica resin, for a resin covering a semiconductor laser chip, in the context claimed. The Office Action relies on Okuda for teaching those claimed elements. However, Okuda is directed to a rear projection screen and not a semiconductor laser device. In particular, the diffusion layer 16 of Okuda serves as part of a lens sheet 10 that receives light of conventional red/green/blue lights.

Applicants submit that it would not have been obvious to one of ordinary skill to incorporate a diffusion layer of Okuda into the semiconductor laser devices of Ogino and Amano. As stated above, neither of the references Ogino and Amano teach or suggest a resin having a light diffusion capability covering a semiconductor laser chip. Thus, Applicants submit that there would be no motivation to incorporate diffusion via a diffusion layer of Okuda into the semiconductor laser devices of Ogino and Amano.

Accordingly, Applicants respectfully request that the rejection of claims 10 and 11 be withdrawn.

CONCLUSION

In view of the above amendments and remarks, reconsideration of the various rejections and allowance of claims 1-20 is respectfully requested.

Should the Examiner have any questions concerning this application, the Examiner is invited to contact Robert W. Downs (Reg. No. 48,222) at (703) 205-8000 in the Washington, D.C. area.

If necessary, the Commissioner is hereby authorized in this, concurrent, and future replies, to charge payment or credit any overpayment to Deposit

Account No. 02-2448 for any additional fees required under 37 C.F.R. § 1.16 or under 37 C.F.R. § 1.17; particularly, extension of time fees.

Respectfully Submitted,

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VERSION WITH MARKINGS TO SHOW CHANGES MADE

IN THE CLAIMS

The claims have been amended as follows:

1. (Amended) A semiconductor laser device including:

a semiconductor laser chip; and

a [molded] resin having a light diffusion capability,

wherein the semiconductor laser chip is covered with the [molded] resin forming a molded lens and wherein the laser light is emitted through said molded lens.

2. (Amended) A semiconductor laser device according to claim 1, wherein the semiconductor laser chip does not directly contact the [molded] resin.

3. (Amended) A semiconductor laser device according to claim 1 further includes a light diffusion plate provided between the semiconductor laser chip and the molded [resin] lens.

4. (Amended) A semiconductor laser device including a semiconductor laser chip covered with resin, having a light diffusion capability and forming a molded lens [according to claim 1], wherein the semiconductor laser chip includes a plurality of light emitting portions.

5. (Amended) A semiconductor laser device including a semiconductor laser chip covered with resin, having a light diffusion capability

and forming a molded lens [according to claim 1], wherein the semiconductor laser chip includes at least one light emitting portion having a width of about 7 μm or more.

6. (Amended) A semiconductor laser device including a semiconductor laser chip covered with resin, having a light diffusion capability and forming a molded lens [according to claim 1] further includes at least one additional semiconductor laser chip.

7. (Amended) A semiconductor laser device according to claim 4, wherein the spot size and radiation angle of an emitted light beam can be controlled by adjusting the intervals between each light emitting portion of the semiconductor laser chip including the plurality of light emitting portions, and the size, material, and shape of the molded [resin] lens.

8. (Amended) A semiconductor laser device according to claim 5, wherein the spot size and radiation angle of an emitted light beam can be controlled by adjusting the width of the light emitting portion of the semiconductor laser chip including the light emitting portion having a width of about 7 μm or more, and the size, material, and dimension of the molded [resin] lens.

9. (Amended) A semiconductor laser device according to claim 6, wherein the spot size and radiation angle of an emitted light beam can be

controlled by adjusting the intervals, between the semiconductor laser chips, and the size, material, and dimension of the molded [resin] lens.

10. (Amended) A semiconductor laser device according to claim 1, wherein materials having different refractive indexes are mixed into the molded [resin] lens.